State P-16 Council's Math Curricula Alignment Committee
August 1, 2006
Meeting Summary

Recorders: Erin O'Hara, Wendy Tabor, GEAR UP professional staff; Crystal Collins, THEC
Summary: Erin O'Hara

The Committee met on August 1, 2006 from 9am-3pm at the Tennessee School Boards Association offices, Nashville, for a working session on alignment of Algebra I curriculum.

Linda Doran, THEC Senior Policy Officer and the chair of the Committee welcomed the group and thanked Committee members for their participation in these important discussions. Dr. Doran highlighted the charge from the P-16 Council to the Committee to develop a seamless set of standards from middle school through high school and into the first year of college. She then outlined the process that the Committee will follow. A small and representative group of Committee members determined that the Committee would first examine curriculum alignment for Algebra I, followed by Algebra II, Geometry, higher level high school math courses and eventually first year of college courses. The focus for college curriculum will be on non-STEM (Science, Technology, Engineering and Mathematics courses).

The Committee agreed to use the criteria developed by ACT for college readiness as a tool for curricula alignment. Dr. Gary Nixon and Dr. Doran both reminded the Committee that their work will serve as a starting point for the State Board of Education and the state curricular team when those bodies begin to revise curriculum standards.

Deborah Boyd, Associate Executive Director for P-16 Initiatives gave participants a quick overview of the progress of the statewide GEAR UP grant. As part of its statewide efforts, GEAR UP TN is sponsoring the work of the Math Curricula Alignment Committee. Dr. Boyd emphasized the importance of curriculum alignment to achieving GEAR UP TN's goal of increasing college access for low-income Tennessee students. GEAR UP TN will operate early intervention efforts in 9 counties statewide. The grant will also work at the state level to support and increase infrastructure for college access and high school graduation.

Katie High of the University of Tennessee and Scott Eddins of the Tennessee Department of Education explained the procedures for the days meeting and the next few working sessions. Dr. High and Dr. Eddins described the sessions as designed to be stakeholder discussions about curriculum and the relationship to the ACT standards. Stakeholders will look at how well aligned the standards are with the current TDOE

curriculum, what is necessary to achieve the standards and what might be extraneous. The section of the ACT standards that the Committee will focus on is those skills needed to score a 20-23. The standard that will be used to as a guide for college readiness is a 22 on the ACT math test, however the standards can be and should be pulled from across the rubric.

The conversation was to look at the learning expectations of students, i.e. what is taught, not how it is taught. The afternoon session was to look at performance indicators using the SPI as the test and the TPI as teacher assessment.

In the morning session, small groups discussed the current TDOE Algebra I curriculum standards as compared to the ACT math standards for college readiness associated with a score of 22. The groups reported out on their findings and were in a good deal of agreement about places where the curriculum was not aligned to ACT standards, where there were questions, and where items might be outside of the scope of Algebra I.

Findings included lack of alignment between Algebra I curriculum and the ACT standards on: solving routine two and three-step arithmetic problems; calculating missing data values; translating from one representation of data to another; multiplying binomials; and locating points on a coordinate plane. All groups were in agreement that measurement of angles and knowledge of angle properties were not in the state curriculum until Geometry. Groups also agreed that quadratic functions were introduced in Algebra I but not full integrated into the curriculum until Algebra II.

The groups also agreed that a number of items included in the state Algebra I curriculum were not included in the ACT standards and did not appear to be tested on the ACT. Those items included using matrices, solving linear systems, analyzing graphs in relation to functions, graphing inequalities, relationships of functions to graphs, using the midpoint formula, Pythagorean Theorem applications, use of units, scales and measurement tools, predicting from a linear data set, and random sampling. Participants also observed some general issues in the application of the Algebra I curriculum such as teachers only teaching to Gateway levels, which fall below ACT levels, and a need for review of basic skills before testing. Additionally, participants commented on the assumption of higher order learning that are present in the ACT college readiness standards.

Following the morning session, Dr. Gary Nixon, Executive Director of the State Board of Education shared the contextual need for the Committee's work. Dr. Nixon recalled a State Board meeting last year where members recognized that although Tennessee students and teachers perform well when compared against other Tennesseans, they suffer when compared to national standards like the National Assessment of Educational Progress. The standard of proficiency for Tennessee state tests is right about at the level of basic on the NAEP test. Dr. Nixon commented that the state is

probably not expecting enough from its students and is misinforming the students on their level of proficiency as compared with national standards. He observed that while the state is reaching a lot of the standards laid out already, students need a greater depth of skills and rigor to compete in society, whether in careers or postsecondary education. Dr. Nixon encouraged the Committee to continue its good work and assured the participants that their recommendations would form the basis of the state's considerations on math curricula.

The afternoon was spent looking at the cognitive alignment of Tennessee's Algebra I standardized and in-class assessments to the ACT college readiness standards. Strong agreement existed among the small groups that several of the ACT readiness standards were not reflected in either TPI or SPI assessments. Those included: calculating missing data values; translating from one representation of data to another; measuring angles using parallel lines; and exhibiting knowledge of basic angle properties. Groups differed in their opinions on the representation of several other items in TPIs and SPIs. Those areas where a few groups but not all had questions about inclusion were: solving routine two and three-step arithmetic problems; exhibiting knowledge of simple counting techniques; understanding the concept of length on a number line; computing area and perimeter; and evaluating quadratic functions. One or two groups thought that multiplying binomials and locating points on a coordinate plane existed in the state curriculum standards, but not in the assessments.

The small groups identified a series of problems related to the alignment of assessments to the college readiness standards. First, there are discrepancies between the TPIs and SPIs. There are also discrepancies between TPI measures and the ACT readiness standards. Additionally and significantly, participants felt that the state curriculum standards and the ACT have different testing goals.

Groups also highlighted specific curriculum problems affecting assessment. Many felt that rational expressions and functional notations should be integrated into the Algebra I curriculum. Tax added and percentage off were also identified as places where the curriculum might be weak. Finally, the strength of the curriculum was recognized, but whether or not it was being properly reflected in the classroom became an overarching question for the Committee.

Following the review of TPI and SPI alignment with ACT college readiness standards, Dr. Mary Martin presented an overview of Bloom's Taxonomy and Gagne's Conditions of Learning as they relate to questions on the ACT, TPI and SPI. The purpose of the exercise was to encourage the Committee to think about and discuss how different cognitive skills are examined in assessments such as the ACT, TPI and SPI. Participants were asked to think about the relationship between the state curriculum standards and ACT, TPI and SPI in light of Bloom and Gagne.

A lively discussion on how to determine the difficulty of a question ensued. Participants observed that vocabulary might have a major influence on students' testing capabilities and that rigor could be improved in classroom vocabulary. Dr. Boyd pointed out that the Department of Education would be engaging in a broad-scale vocabulary improvement effort that school systems could work with in the coming year. The discussion on assessment difficulty centered around how the level of difficulty on a test might be determined from abstraction to multiple processes to correlations to particular standards versus broad concepts. The Committee agreed that the major component of raising achievement on tests is providing students with additional experience on typical types of problems. The Committee will think about the functionality of their recommendations for curriculum and assessment as well as what increasing rigor means and the structure for getting there.

A number of items were addressed as the wrap for the day. Dr. Eddins provided clarification on the nature of the Gateway test as it relates to the Tennessee frame. He noted that there is flexibility to change the style of question, but generally things have not changed much from year to year. He added that having the questions matching the SPI was certainly avoided. He further noted that Committee members could find sample Gateway questions on the SDE website and there these samples include new items. The discussion broadened to touch on the topic of how much attention ACT math scores receive by classroom teachers relative to the significance of State assessments. It was observed that ACT math scores in the aggregate are used in curricula planning but are not factors in daily classroom operations.

Tammy Jones gave a brief summary of information she gained about a transitional senior year math course under development through SREB. Dr. attended the recent High Schools That Work SREB conference and spoke to the course developers. Dr. Jones will provide additional information as it is forthcoming.

Dr. Nixon briefed the Committee on the status of the High School Redesign initiative, noting that the current thinking of the committee is to recommend 3 paths for the high school diploma, with the objective that 70% of present 3rd graders would complete a scholastic 24 unit path that required 4 math credits; a science sequence of biology, chemistry, and physics (or AP or IB science); and a 4-unit concentration for the college prep and the career paths. Dr. Nixon requested "straw" recommendations for the alignment policy changes from the Committee. These recommendations will be discussed at subsequent meetings.

The meeting was adjourned with thanks to the Committee for excellent work through the day and commitment to next steps in the math curricula alignment process as the same protocol is applied to Algebra II, Geometry, advanced math, and first-year college mathematics. Dr. High commended the group and suggested that the Committee could work through electronic exchange for some of the steps for the alignment. Dr. Doran

will provide a summary of day's outcome for feedback and potential dates for a second session through email.

The Committee adjourned at 3:00 pm (CDT).